

REMARKS

By the above amendment, claims 70 - 77 have been canceled without prejudice or disclaimer of the subject matter thereof and new claims 78 - 89 have been presented wherein claims 78, 82 and 86 are independent claims more clearly reciting features of the present invention.

Applicants consider that an interview may be helpful in resolving any outstanding matters and request the Examiner to contact the undersigned attorney to schedule an interview when taking up this application for action.

At the outset, applicants note the present invention is directed to a plasma etching apparatus for etching processing of a sample disposed in a chamber by plasma which is generated in the chamber by an electric field and processing gas. The present invention as described in the first full paragraph at page 7 of the specification is based upon the discovery by applicants that when the inner wall surface temperature in the reactor is controlled to a temperature sufficiently lower than that of a wafer, a strong coating film is formed on the inner wall surface which is not peeled off so that damage and dust is not caused during the etching processing of the wafer. As described in the paragraph bridging pages 15 and 16 of the specification, on a side wall 102 of the processing chamber 100, as shown in Fig. 1, a jacket 103 for controlling the temperature of the inner surface of the side wall is held in an exchangeable state and a heat exchanging medium is circulated and supplied into the jacket 103 from a heat exchanging supply means 104 so as to control the temperature. It is noted that the temperature is controlled or adjusted to be lower than the temperature of the wafer during the etching processing and thereby enables a coating film to be formed on the jacket or member which does not

peel off. The specification at pages 21 - 23 describes experimental results obtained when the inner wall surface temperature is controlled to a constant temperature which is sufficiently lower than the temperature of the wafer resulting in a strong coating being formed in accordance with the present invention, as described in the paragraph bridging pages 18 and 19 of the specification, the temperature of the sample or wafer is also controlled. In particular, the temperature of the heat exchanging medium which circulates within the member or jacket is adjusted so as to adjust the surface temperature of the member or jacket which is in contact with the plasma to be lower than the sample or wafer being etched and to obtain a strong coating film on the member or jacket as described.

During the etching processing, products formed in the processing chamber are deposited to the surface of the member or jacket in which the temperature thereof is adjusted to a temperature lower than the temperature of the sample during etching processing, whereby the change of the temperature of the member or jacket is decreased, and the products are deposited more firmly on the surface of the member as a coating so as to suppress peeling from the member and suppress occurrence of contaminants or scrapping or consumption at the surface of the member, thereby improving the reliability and the reproducibility of the etching process. Moreover, since the heat exchange medium is supplied into the member or jacket during the etching processing, the surface temperature of the member or jacket does not increase or decrease greatly depending on the generation of the plasma during the etching processing or extinction of the plasma after the processing as in the case of merely disposing the member in the vacuum vessel or in the case of supplying a heat conductive gas between the vessel and the member whereby the temperature on the surface of the member is made more stable and enabling the

strong coating to be formed on the member or jacket which suppresses cracking or peeling due to thermal expansion or contraction of the products to be deposited. Applicants submit that these features are recited in the claims of this application and are not disclosed or taught in the cited art as will become clear from the following discussion.

The rejection of claims 70 - 73 under 35 USC 103(a) as being unpatentable over Tsuji et al (JP 4-214873) in view of Shinji (JP 9-275092) and Ishioka (JP 3-104222), and the rejection of claims 74 - 77 under 35 USC 103(a) as being unpatentable over Tsuji et al (JP 4-214873) in view of Shinji (JP 9-275092) and Ishioka (JP 3-104222) further in view of Otsubo et al (US 4,985,109), such rejections are traversed insofar as they are applicable to the present claims and reconsideration and withdrawal of the rejections are respectfully requested.

As to the requirements to support a rejection under 35 USC 103, reference is made to the decision of In re Fine, 5 USPQ 2d 1596 (Fed. Cir. 1988), wherein the court pointed out that the PTO has the burden under '103 to establish a prima facie case of obviousness and can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. As noted by the court, whether a particular combination might be "obvious to try" is not a legitimate test of patentability and obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. As further noted by the court, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

Furthermore, such requirements have been clarified in the recent decision of In re Lee, 61 USPQ 2d 1430 (Fed. Cir. 2002) wherein the court in reversing an obviousness rejection indicated that deficiencies of the cited references cannot be remedied with conclusions about what is "basic knowledge" or "common knowledge".

The court pointed out:

The Examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question of motivation is immaterial to patentability, and could not be resolved on subjected belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher."... Thus, the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion. (emphasis added)

Turning first to Tsuji et al, the Examiner contends that this reference shows the invention substantially as claimed with an aluminum member 20 held against the sidewall inside of the chamber and forming an inner surface of the chamber which is in contact with the plasma generated in the chamber referring to Figure 1 and a thermally conductive medium 21B being circulated inside of the member so as to control the temperature of the member within a predetermined range, wherein the thermally conductive medium is a coolant (see, for example, paragraphs 0032 and Fig. 1). Applicants submit that contrary to the position set forth by the Examiner, it is not seen that the aluminum member 20 is detachably held on an inner surface of the sidewall of the vacuum vessel nor that the member 20 has a thermally conductive

medium supplied therein so as to circulate within the member during the etching processing of the sample as recited in new claim 78 of this application. Rather, applicants submit that Tsuji et al discloses coils 21A and 21B which surround the member 20 and are not disposed within the member 20 and the thermally conductive medium, whether a heating medium or a cooling medium for a respective coil, being circulated within the coil and not the member 20. Furthermore, applicants submit that Shinji et al is directed to a cleaning operation for an ECR plasma CVD device which does not provide for etching processing of a sample or wafer 10 with the thermally conductive medium being utilized during a cleaning operation of the chamber and not during an etching operation. Applicants submit further that irrespective of the disclosure of Shinji et al, there is no disclosure or teaching of "a temperature controller to adjust the thermally conductive medium so as to adjust a temperature of the surface of the member during the etching processing of the sample to be lower than a temperature of the sample during the etching processing thereof" (emphasis added) as recited in claim 78 and essentially correspondingly recited in claims 82 and 86 of this application. It is apparent that not only does Shinji et al fail to disclose or teach a plasma etching apparatus, but also fails to disclose or teach a temperature controller effecting adjusting of temperature in the manner set forth during etching processing of the sample or wafer. Thus, irrespective of the position by the Examiner, Shinji et al does not disclose or teach the recited features of the independent and dependent claims of this application in the sense of 35 USC 103.

The Examiner recognizes that Shinji et al does not expressly disclose that the member 20 is detachable and removable to the outside of the chamber, but contends that Shinji discloses a cylindrical plasma apparatus comprising a member

12 that is detachably attached to the chamber in order to be easily removable, therefore, reducing the cleaning time of the apparatus. Furthermore, the Examiner contends that Ishioka discloses a plasma apparatus comprising a removable shield 17 for enabling removing of the shield during maintenance and management of the system. The Examiner contends that in view of these disclosures, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Tsuji et al as to comprise a detachable member because in such a way maintenance and management of the apparatus is more easily performed, and the cleaning time of the apparatus is reduced.

Irrespective of such positions by the Examiner, applicants submit that Shinji discloses that a cooling gas is introduced into the space between the protective wall member 12 and a side wall of the chamber. Thus, even though the protective wall member 12 is exchangeable, such member 12 is not "detachably held on an inner surface of a side wall of the vacuum vessel" (emphasis added) as recited in claim 78 and the other independent claims of this application, nor does the protective wall member have "thermally conductive medium supplied therein so as to circulate within the member during the etching processing of the sample" (emphasis added) as recited in claim 78 and the other independent and dependent claims of this application. Likewise, there is no disclosure or teaching of a temperature controller adjusting the temperature of the surface of the member during the etching processing of the sample to be lower than a temperature of the sample during the etching processing thereof, as also recited in claim 78 and the other claims of this application. Although Shinji discloses a plasma processor, it is readily apparent that Shinji fails to disclose the other features of the claimed invention which are also not disclosed or taught by Tsuji et al such that the combination of Tsuji et al and Shinji

fail to provide the claimed features of the independent and dependent claims of this application in the sense of 35 USC 103. Applicants further note that Shinji indicates that the aim of cooling the inner surface is to suppress the occurrence of fluctuation such as for the amount of polymer deposited to the protective wall member as a result of elevation of the surface temperature of the protective wall member caused by the heat generated in the chamber which gives undesired effects on the characteristics of the process such as the etching rate. However, Shinji fails to disclose the other features and does not overcome the deficiencies of Tsuji et al as pointed out above and all claims patentably distinguish over the proposed combination.

With respect to Ishioka et al, while Figure 2 thereof discloses a shield 27 in which coolant 19 is circulated, it is readily apparent that the shield 27 is not "detachably held on an inner surface of the side wall of the vacuum vessel" and does not disclose or teach "a temperature controller to adjust the thermally conductive medium so as to adjust the temperature of the surface of the member during the etching processing of the sample to be lower than a temperature of the sample during the etching processing thereof" (emphasis added) as recited the independent and dependent claims of this application. As such, applicants submit that the combination of Ishioka with Tsuji et al and/or Shinji, fails to provide the claimed features in the sense of 35 USC 103 and such features cannot be disregarded and patentably distinguish over this cited art in the sense of 35 USC 103, such that all claims should be considered allowable thereover.

Although the Examiner contends that the features that the apparatus being a plasma etching apparatus, cooling the surface of the member during etching processing of the sample so that products generated in the chamber during the

etching processing of the sample are deposited on the member, a temperature of the surface of the member is controlled within the claimed temperature range, and a temperature of the surface of the member is controlled to be lower than the temperature of the sample during the etching processing of the sample, are directed to method limitations instead of apparatus limitations and are viewed as intended use and do not patentably distinguish from the claimed invention, applicants submit that the features as claimed cannot be disregarded. Whether or not the apparatus of the cited art could be capable of operating in the manner defined, there is no disclosure or teaching of the apparatus having the characteristics or features as recited whether or not considered by the Examiner to be method limitations and all limitations must be considered in determining patentability of the claimed invention. The Examiner is referred to the decision of In re Luck and Gainer, 177 USPQ 523 (CCPA 1973) wherein the Court pointed out that in connection with product claims, which include process steps to wholly or partially define the claimed product, this process limitations distinguish the product over the prior art and they must be given the same consideration as traditional product characteristics. Likewise, in terms of an apparatus, the characteristics or process limitations thereof must be given consideration in determining patentability over the cited art and "obvious to try" is not the standard of 35 USC 103. See, In re Fine, supra. Thus, applicants submit that each of the independent and dependent claims recite structural features which patentably distinguish over the cited art and should be considered allowable thereover. As to the decision cited by the Examiner, applicants submit that such decisions do not relate to the structural features in the body of the claim having the characteristics or operating in the manner defined and as pointed out above, there is no disclosure in the cited art to provide the structural arrangement as claimed.


With regard to the addition of Otsubo et al to the claimed invention, whether or not this patent discloses an antenna 5, as contended by the Examiner, Otsubo et al does not overcome the deficiencies of the other cited art as described above and applicants do not recite the feature of an antenna in the claims of this application. Accordingly, applicants submit that all claims patentably distinguish over this cited art in the sense of 35 USC 103 and should be considered allowable thereover.

In view of the above amendments and remarks, applicants submit that all claims present in this application should now be in condition for allowance and issuance of an action of a favorable nature is courteously solicited.

Applicants again request the Examiner to contact the undersigned attorney to schedule an interview upon taking up this application for action.

To the extent necessary, applicant's petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (520.34403CV4) and please credit any excess fees to such deposit account.

Respectfully submitted,



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